# pipe-in-Pipe Applications

in the

Petrochemical Industry



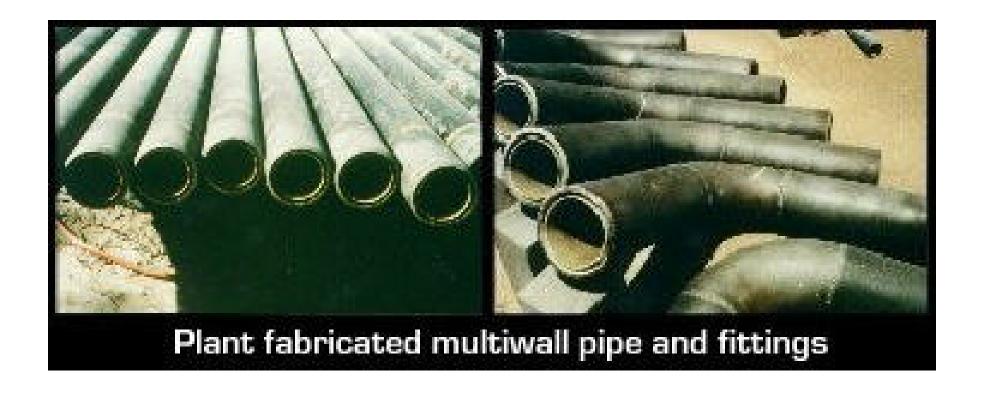
# APPLICATIONS FOR DOUBLE WALLED PIPING

- Containment
- Corrosion
- Market Protection
- Constructability
- Heat transfer

#### CONTAINMENT

- Kuel transfer
- Make a second s
- Toxic substances
- Potable water
- Nuclear

## CONTAINMENT AND CORROSION FIBERGLASS - MORTAR - STEEL SYSTEM





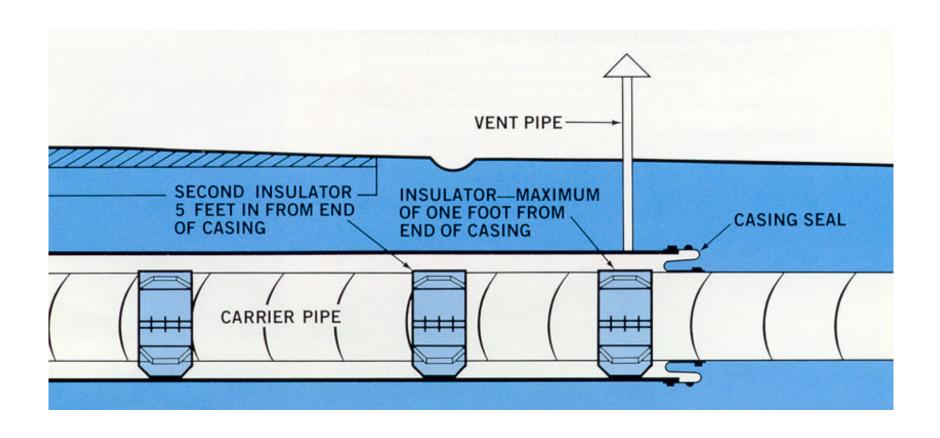
#### MECHANICAL PROTECTION

#### **CASED CROSSINGS**

- **Railroads**
- **Highways**

#### DRAKE POINT F-76 SHORE APPROACH

#### TYPICAL CASED CROSSING



DRAKE
POINT
F-76
FLOWLINE
BUNDLE

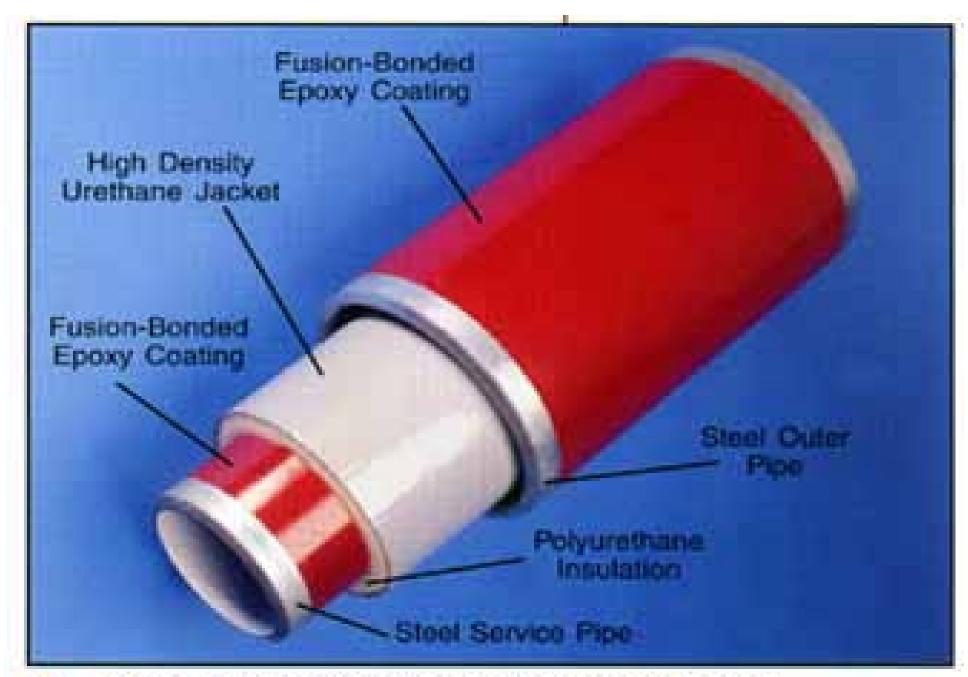


#### F-76 PULLHEAD EXITING CARRIER PIPE



#### LANDFALL OF DRAKE POINT F-76 PIPELINE







Pipe-in-pipe for deep water application

QUADRUPLE PIPE SECTIONS READY FOR J-LAY



### **CONSTRUCTABILITY - Offshore Pipelines**

**Bundles** 

**Buoyancy** 

control

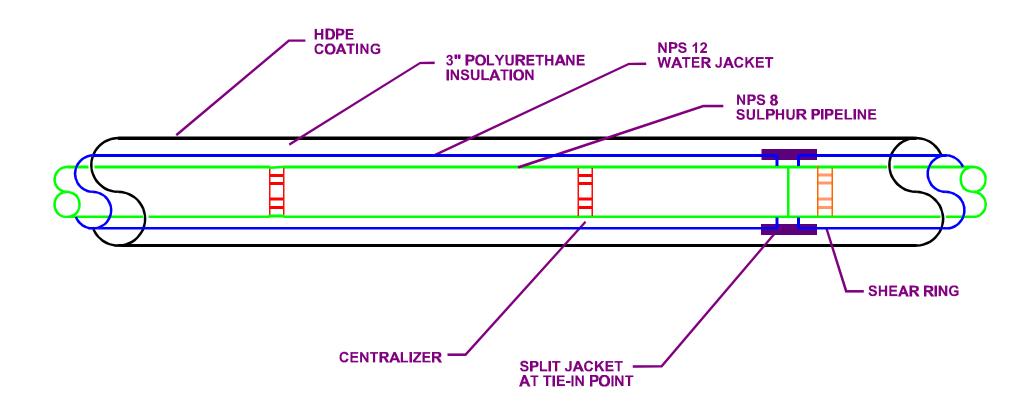
**Insulation** 

E.g. Troika J-Lay

#### **HEAT TRANSFER**

- Wet natural gas
- Oilwell tubulars in permafrost
- Liquid sulphur

### LIQUID SULPHUR PIPELINE



## DESIGN ISSUES DOUBLE WALLED PIPELINES

- 1 Complex stress-strain analysis
  - local stress at bulkheads and spacers
  - different loads
  - different responses to loads
- 2 Electrolytic corrosion
  - if both pipes are steel
- **3** Complex interpretation of integrity logs
- **4** Construction complexity
- 6 Repair

Pipe-in-Pipe

**Applications** 

in the

Petrochemical

Industry

- **→** Containment and Corrosion
- **→** Mechanical Protection
- **→** Constructability
- **→** Heat Transfer

